



E&M Circuit to Packet



- AES Encrypted E&M Voice and Signaling Circuit Emulation

E&M Signaling and Voice over Packet Networks

The **Black•Tube CEP E&M** converts E&M Circuit interfaces into AES Encrypted Packets for secure interconnection over Ethernet packet networks. This conversion facilitates the interconnection of E&M 4-Wire Voice with 4-Wire Signaling over cost effective and ubiquitous Ethernet based LAN/WAN/MAN wired and wireless network services such as MPLS, xDSL, Cable Modem and 4G/LTE.

The **Black•Tube CEP E&M** has one to three E&M balanced 4-Wire 600 ohm Voice Frequency interfaces with signaling such as Push to Talk Relay transfer. A PCM CODEC converts Analog Voice Band into Digital for transport over Ethernet packet services.



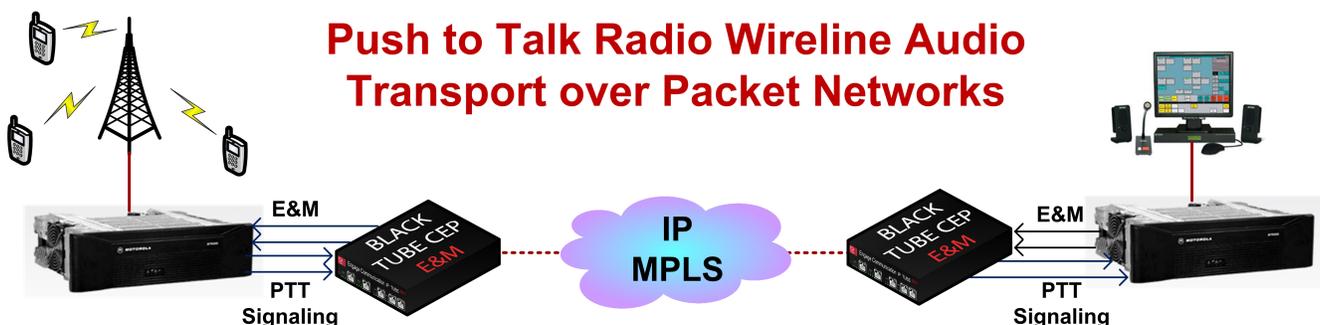
Public Safety Radio Tower Wireline Audio over Packet Networks

A primary application for the **Black•Tube CEP E&M** is the conversion of Voice Grade circuit interfaces with Push to Talk, that connect Public Safety Radio Base Stations to concentrator hubs, into packets. The **Black•Tube CEP E&M** employs high resolution Analog to Digital circuitry that maintains the quality of the original audio signal.

The packetized Voice Band communication can be transported over Ethernet Packet services such as:

- xDSL • Cable • Cellular 2/3/4G LTE • MPLS • WiFi

Push to Talk Radio Wireline Audio Transport over Packet Networks



Black•Tube CEP Management

Management Module

Black•Tube CEP isolates management and data plane functionality with the use of two separate processor modules. Management processor access is limited to encrypted sessions via SSH, or SNMPv3, that employ AES 256 bit keys and sophisticated NIST passwords. These sessions may be established after authentication via TACACS+ or Radius.

The independent Linux based management plane of the Black•Tube CEP ensures Critical Infrastructure Data is isolated from management network access. The Management Module uses internal serial ports to connect to the Data Plane processor.

Administration and User Logs are available with Syslog.

Black•Tube CEP E&M Features

Assured Delivery Protocol

In order to assure high quality communications over networks with intermittent or noisy performance, such as Wireless, the Black•Tube CEP E&M employs Engage's robust Assured Delivery Protocol with the following benefits:

- Packet out of sequence detection and re-sequencing
- Lost packet retransmissions with configured delay

Protector OPTION -PRO

The protector option utilizes the second LAN interface as a redundant path for the interconnection of the IP encapsulated E&M circuit.

The extension of the E&M has a fault tolerant link that is configured to always on, or with switch over criteria.

Technical Specifications

LAN Network Interface:

- LAN1 & LAN2: Two Data Plane 10/100 Base T
- MLAN: Control Plane 10/100 Base T

LAN Network Protocols Supported:

- IP, TCP, UDP, ICMP, Telnet, DHCP, DDNS, SSH

E&M Interface(s):

- One to three: E&M 4-Wire Full Duplex Voice with PTT Relay support
- 600 Ohm Balanced • Frequency 200 to 3400 Hertz

VF Over IP Protocol:

- uLaw CoDec • TDM Over IP • Circuit Extension Services Over IP

Regulatory:

- CE • Safety -IEC60950 • EMC - CFR 47 Part 15 Sub Part B:2002, EN55022:1994+A1&A2, EN55024, ICES-003 1997, CISPR 22 Level A

Quality of Service Support:

- IP Type of Service (TOS) CLI configured • IANA Registered UDP Port 3175
- 802.1p/q mac level prioritization

Management:

- Secure Socket Shell - SSH V2 - Session Encryption
- Centralized Authentication, Authorization and Accounting - TACACS+, RADIUS, Two Factor Authentication
- Syslog with NTP Time Stamping
- Console Port for Out of Band Management
- SNMP V3 Public and Private MIB support with configured traps

Dimensions:

- Dimensions: 9" (L) x 7.3" (W) x 1.50" (H)

Environmental:

- -10° to 50°C operating temperature
- Up to 90% operating humidity (non-condensing)

Power:

- 12-30 VDC, 1.0A. • Screw Locking Connector
- Universal Adapter 100/240 VAC 50/60 Hz
- Optional -48V 0.25 Amp • Hot Standby

How to Order — Black•Tube CEP E&M

Part No.	Description	Notes
007-E&MS-0x	Black•Tube CEP E&M 4 Voice 4 Signaling	Specify # of E&M PTT Ports (1-3)
CH-007-E&MS-03	Chassis Slot Card: Black•Tube CEP E&M	Specify # of E&M PTT Ports (3)
Base Option	Specify as suffix	
-PRO	Protector Option	Fault Tolerant Network Interconnect
Power Options	Specify as suffix	Hot Standby Configuration 2nd Power Suffix
-HSPDC	Connector for Dual 12-26 VDC Supply	Wire to Screw Terminal Removable Connector
-WIREDC	Power Supply Module 12/26 VDC Screw Term	
-N48VDC	Power Supply Module Negative 48 Volt DC	Isolated Negative 48 Volt Power
Rack Mount Option		Specify as suffix
-RACKMNT	19" Wide Rack Mount Brackets	Enclosure Nut Serts Installed